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Reply Brief in Response to
Examiner's Answer of 17 April 2009

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.   : **10/596135**
Applicant   : PAUWS, Steffen Clarence
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Examiner   : **VO, Cecile H.**
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Title: SEARCHING IN A MELODY DATABASE

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REPLY BRIEF UNDER 37 CFR 41.41

Sir:

This is a Reply Brief in response to the Examiner's answer dated 17 April 2009 in the subject application.

RESTATEMENT OF GROUNDS OF REJECTION

Claims 1-20 are rejected under 35 U.S.C. 102(e) over Tsui et al. (USPA 2007/0163425, hereinafter Tsui.

Claim 11 is rejected under 35 U.S.C. 101.

REMARKS REGARDING EXAMINER' ANSWER

Claim 11

The Examiner notes that the rejection of claim 11 under 35 U.S.C. 101 was not addressed in the applicant's Appeal Brief. An amendment to the Appeal Brief has been sent under separate cover, correcting the "STATUS OF CLAIMS".

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Claims 1-20

The Examiner continues to obfuscate the mapping of elements in Tsui to the applicant's claimed elements. In the rejection of claim 1, the Examiner appears to assert that Tsui's musical notes correspond to the applicant's claimed query sub-strings:

> "[Tsui's] melody to note conversion subsystem converts the digitized input melody (as a query string) into a sequence of musical notes (as sub-strings)" (Examiner's Answer, page 4, lines 12-14).

Yet, in response to the applicant's argument that Tsui does not teach independently searching a melody database for a closest match for each sub-string, the Examiner denies this mapping:

> "The Examiner did not construe "each note" as "a substring" (Examiner's Answer, page 10, lines 8-9).

The Board of Patent Appeals and Interferences has consistently upheld the principle that the burden of establishing a prima facie case resides with the Office, and to meet this burden, the Examiner must specifically identify where each of the claimed elements is found in the prior art:

> "there must be no difference between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention. Scripps Clinic & Research Found. v. Genentech, Inc., 927 F.2d 1565, 1576, 18 USPQ2d 1001, 1010 (Fed. Cir. 1991). To meet [the] burden of establishing a prima facie case of anticipation, the examiner must explain how the rejected claims are anticipated by pointing out where *all* of the specific limitations recited in the rejected claims are found in the prior art relied upon in the rejection." *Ex Parte Naoya Isoda*, Appeal No. 2005-2289, Application 10/064,508 (BPAI Opinion October 2005).

The applicant respectfully notes that it is the duty of the Examiner to specifically identify each and every element and limitation of a claim in the cited reference as per 37 CFR 1.104(c)(2) and MEP 707, which explicitly state that "the particular part relied on must be designated."

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The final Office Action and this Answer are not in compliance with 37 C.F.R.
§1.104(c)(2) and MPEP 707 because the pertinence of Tsui with respect to each of
the elements of claim 1is not clearly explained. The goal of prosecution has not been
met under MPEP 706 because the Office has not clearly articulated its rejection so
that the applicant could have a fair opportunity to provide evidence of patentability
and otherwise reply completely at the earliest opportunity.

Tsui specifically teaches decomposing a query string into a series of notes:
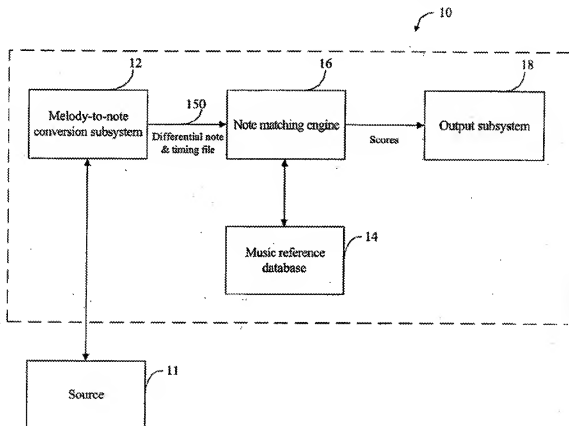
As is clearly evident, Tsui's "Melody-to-**note** conversion subsystem" 12 decomposes
a query string from the "Source" 11 and provides characteristics of each note to the
"**Note-matching** engine" 16.

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If Tsui is asserted to teach decomposing a query into a plurality of sub-strings and comparing each of these sub-strings to sub-strings of songs in a database, and Tsui clearly teaches decomposing a query into a plurality of notes and comparing each of these notes to notes of songs in the database, the assertion is only supported by interpreting each note of Tsui as a sub-string.

If each note of Tsui is not interpreted as corresponding to a sub-string, then it cannot be said that Tsui teaches decomposing a query into a plurality of sub-strings and comparing each of these sub-strings to sub-strings of songs in a database.

The Examiner implies that Tsui's notes correspond to the claimed sub-strings, then denies this implication, but fails to identify any other element in Tsui that is asserted to correspond to the claimed plurality of sub-strings. Of particular note, the claimed plurality of sub-strings of claim 1 are used for "independently searching a melody database for at least a respective closest match for each sub-string of the plurality of query sub-strings". Tsui teaches searching for a query string by comparing notes in the query to notes in songs in a database. Tsui does not teach that the plurality of notes in the query are used for independently searching a melody database for at least a respective closest match for each note of the plurality of query notes.

Tsui teaches processing the notes of the entire query to find a closest match, based on the degree of correspondence between the notes of the query and the notes of each song. Tsui's notes are not processed "independently" from one another, as specifically claimed. The Examiner fails to identify where Tsui teaches an independent search of a melody database for a closest match to each note of the query, and the applicant respectfully maintainss that such an independent search for each note would produce meaningless results.

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Consider a query search of notes C-A-C-D-B-F. An independent search of the database for the closest note "C" in the database that matches the note "C" in the query would produce a first result, then the independent search of the database for the closest note "A" in the database that matches the note "A" in the query would produce a second result, then the independent search of the database for the closest note "C" in the database that matches the second note "C" in the query would produce a third result, and so on. However, by processing each note independently, the composite of these results would not indicate which songs had the particular C-A-C-D-B-F sequence of notes in the query.

Tsui's method would identify which songs have the particular C-A-C-D-B-F sequence, because Tsui does *not* independently search for a match to each note. Tsui teaches searching for the given sequence of notes in the query, including recognizing the possibility of insertions and deletions, and scoring the corresponding sequences in the database accordingly. The concept of identifying insertions and deletions necessarily requires a sequential dependency among the notes, and Tsui's equations describing the operations in the note matching engine 16 use ordered subscripts, and ordered pairings between the notes in the query and the notes in the song being assessed (Tsui, paragraphs [0090]-[0091]).

In the context of the applicant's invention, the asserted independent search for each note in Tsui would not identify, for example, which songs had a C-A-C sub-string and which songs had a D-B-F sub-string of the query C-A-C-D-B-F. Because Tsui does not teach the elements of the applicant's independent claims 1, 11, and 12, the applicant respectfully maintains that the rejection of claims 1-20 under 35 U.S.C. 102(e) over Tsui is unfounded, and should be reversed by the Board.

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Claims 2 and 13

In response to the applicant's argument that the cited text of Tsui does not address the claimed element of claims 2 and 13, the Examiner repeats the basis for rejecting claims 2 and 13, without addressing the fact that the cited text of Tsui ([0004] lines 1-4) that is relied upon to support this rejection does not address sub-strings that are "a phrase of a melody":

> "The melody-to-note conversion subsystem 12 converts the digitized input melody 20 into a sequence of musical notes characterized by pitch, beat duration and confidence levels." (Tsui [0042] lines 1-4.)

Nowhere in the cited text does Tsui teach " decomposing the query string into sub-strings that each substantially correspond to a phrase of a melody", as specifically claimed in claims 2 and 13.

Accordingly, because the Examiner fails to identify where Tsui teaches decomposing the query string into sub-strings that each substantially corresponds to a phrase of a melody, the applicant respectfully maintains that the rejection of claims 2 and 13 under 35 U.S.C. 102(e) over Tsui is unfounded, and should be reversed by the Board.

Claims 5, 8, and 16-17

The Examiner repeats the assertion that Tsui teaches a query comprising multiple input modalities and decomposing the query based on changes between modalities, but fails to identify where Tsui teaches a query with multiple input modalities.

Tsui teaches that any of a variety of modalities ("music-like vocalizations") may be input, but does not mention that multiple modalities may be included in a single query, and, specifically, does not teach decomposing the query based on a change of modality. Tsui treats all changes in pitch as boundaries between notes (Tsui [0047]-[0049]); Tsui does not distinguish between different types of modalities in the identification of boundaries between notes.

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Because Tsui does not teach the elements of the applicant's claims 5 and 16, upon which claims 8 and 17 depend, the applicant respectfully maintains that the rejection of claims 5, 8, and 16-17 under 35 U.S.C. 102(e) over Tsui is unfounded, and should be reversed by the Board.

Claims 8 and 17

The Examiner repeats the assertion that Tsui teaches detecting the change in input modality based on a classification criteria of each input modality, but fails to identify where Tsui teaches classification criteria for each input modality. The Examiner cites Tsui [0104] for this teaching, but Tsui [0104] is silent with regard to input modality, and silent with regard to classification criteria for each input modality. Because Tsui does not teach the elements of the applicant's claims 8 and 17, the applicant respectfully maintains that the rejection of claims 8 and 17 under 35 U.S.C. 102(e) over Tsui is unfounded, and should be reversed by the Board.

Claims 6-7, 10, and 18-20

The Examiner repeats the assertion that Tsui teaches estimating how many sub-strings are present in the query string at [0062] lines 5-16, but fails to address the fact that the cited text is silent with regard to estimating the number of substrings in the query string:

> "The estimated pitch period of the frame is determined by selecting the pitch period candidate that corresponds to a large auto-correlation peak while simultaneously considering how "close" the pitch period candidate is to pitch period estimates in one or more adjacent frames. The adjacent frames may be preceding or receding frames, or both. The preferred embodiment employs a cost function which weights the size of the auto-correlation peaks and the closeness of the corresponding pitch period candidates to pitch period estimates in adjacent frames. This analysis presumes that the human vocal tract cannot radically alter pitch in the short time period represented by a frame, e.g., 1/32 second." (Tsui [0062] lines 5-16.)

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As is clearly evident, the cited text addresses determining the duration of constant pitch across frames. The determination of pitch of any frame is based on the characteristics of the frame, as well as the determined pitch of adjacent frames, as a means of filtering spurious sounds. The output of this determination is illustrated in Tsui's FIG. 3, line 56, repeated numerals indicating a pitch period that extends across multiple frames. The cited text does not address estimating a number of sub-strings in the query string.

Further, the Examiner repeats the assertion that Tsui teaches determining sub-string boundaries by minimizing a total distance measure between centroids at paragraph [0011], but fails to address the fact that paragraph [0011] is silent with respect to centroids, and silent with respect to minimizing distances between centroids:

> "One aspect of the invention provides a method and related system for converting a digitized melody into a sequence of notes. Generally speaking, the method involves estimating breakpoints in the input melody based on changes in the distribution of energy across the frequency spectrum over time. In the preferred embodiment, the melody is segmented into a series of frames. A spectral energy distribution (SED) indicator is computed for each frame and at least initial breakpoints estimates are derived based on the SED indicator. Notes are defined between adjacent breakpoints." (Tsui [0011].)

As is clearly evident, the cited text merely states that breakpoints are estimated based on changes in energy distribution across the frequency spectrum over time, based on a spectral energy distribution, without a description of the details involved with this determination. Contrary to the Examiner's assertion that this determination is based on a distance measure between centroids, the determination is performed as detailed above with regard to Tsui [0062], wherein the breakpoints are found based on the spectral characteristics of each frame and the pitch of adjacent frames, as detailed in Tsui [0063].

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The Examiner also repeats the assertion that Tsui teaches minimizing the distance measure until a predetermined convergence criterion is met at [0008], but fails to address the fact that the cited text does not address convergence, and does not address a convergence criterion:

> "One aspect of the invention provides a method and system for converting a digitized melody into a series of notes. The method and system receive a digitized representation of an input melody, identify breakpoints in the melody in order to define notes therein, determine a pitch and beat duration for each note of the melody, and associate a confidence level with each breakpoint, or each note, or both." (Tsui [0008].)

As is clearly evident, the cited text states that a digital melody is converted into a series of notes defined by pitch and beat duration, with a confidence level associated with each note. The cited text fails to address convergence, and does not teach minimizing a distance between centroids until a predetermined convergence criterion is met, as claimed.

Because Tsui fails to teach the elements of claims 6-7, 10, and 18-20, and because the Examiner fails to identify where Tsui provides such teachings, the applicant respectfully maintains that the rejection of claims 6-7, 10, and 18-20 is unfounded, and should be reversed by the Board.

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CONCLUSIONS

Because Tsui fails to teach searching a melody database for at least a respective closest match for each sub-string of a plurality of query sub-strings, and fails to teach determining at least a closest match for the query string based on the search results for such sub-strings, and because the Office action's proposed interpretation of Tsui would not provide a viable melody search technique, the applicant respectfully requests that the Examiner's rejection of claims 1-20 under 35 U.S.C. 102(e) be reversed by the Board, and the claims be allowed to pass to issue.

Because Tsui fails to teach the elements of the dependent claims discussed above, the applicant respectfully requests that the Examiner's rejection of each of claims 2, 5-8, 10, 13, and 16-20 under 35 U.S.C. 102(e) be reversed by the Board, and the claims be allowed to pass to issue.

Respectfully submitted,

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